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Three new cercosporoid fungi from the Brazilian Atlantic Forest

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ABSTRACT — Three new cercosporoid hyphomycetes were found associated with leaf spots on three host families in a stretch of Atlantic Forest in Viçosa, Minas Gerais, Brazil: *Pseudocercospora aurelianae* sp. nov. on *Aureliana velutina* (Solanaceae), *P. vicosae* sp. nov. on *Eupatorium* sp. (Asteraceae), and *Passalora rollinae* sp. nov. on *Rollinia sylvatica* (Annonaceae). These three species are fully described, illustrated, discussed, and compared with allied species in the present work.

KEY WORDS — *Capnodiales*, *Dothideomycetes*, *Mycosphaerellaceae*, taxonomy, tropical fungi.

Introduction

Brazil is considered one of twelve countries with so-called mega-diversity. Covering the major biomes, the Atlantic Forest is regarded as one of the greatest repositories of biodiversity on the planet with ca. 20,000 plant species, of which 8000 are endemic (Myers et al. 2000). For example, in a single region in southern Bahia state, 450 angiosperms were reported per hectare (Varjabedian 2010). Because the Atlantic Forest has been reduced to 7.5 % of its original extent (Myers et al. 2000), the study of mycobiota in this endangered biome has priority.

The lack of knowledge of the mycobiota associated with Atlantic Forest plants can best be improved by comprehensive examination of certain fungal groups (Pinho et al. 2012). We decided to study cercosporoid hyphomycetes, as the knowledge of the diversity of this fungal group in tropical environments is still sparse. In addition, cercosporoids are among the largest groups of anamorphic fungi and are commonly associated with leaf spot diseases on almost all families of flowering plants worldwide (Crous & Braun 2003). First studies of cercosporoids in Brazil were made by Viégas and Batista (Viégas 1945; Silva & Minter 1995).

During the last decades, several papers have dealt with cercosporoid fungi from Brazil (Crous et al. 1997, 1999, 2011; Crous & Câmara 1998; Barreto et al. 1999). The majority of species have been reported in other biomes, mainly cerrado (Dianese & Câmara 1994; Medeiros & Dianese 1994; Inácio et al. 1996; Dianese et al. 1998, 1999; Braun et al. 1999; Furlaneto & Dianese 1999; Inácio & Dianese 1998, 1999; Braun & Freire 2002, 2004, 2006; Dornelo-Silva & Dianese 2003; Dornelo-Silva et al. 2007; Hernández-Gutiérrez & Dianese 2008, 2009; Freire & Braun 2009). Sporadic works on cercosporoid fungi in Atlantic Forest fragments revealed some new, undescribed species, such as the first reports of cercosporoid fungi on hosts of the family *Siparunaceae* and a revision of cercosporoids on *Piperaceae* (Pereira et al. 2003, 2006, 2007; Vieira & Barreto 2004; Pereira & Barreto 2005, 2006; Soares & Barreto 2005; Rocha et al. 2007, 2008, 2010; Silva & Pereira 2007, 2008, 2010, 2011; Alves et al. 2008; Macedo & Barreto 2008; Almeida et al. 2010; Alves & Barreto 2010; Machado et al. 2012; Silva et al. 2012). In this paper, we introduce three new species, one on *Solanaceae*, one on *Annonaceae*, and one on *Asteraceae*.

Material & methods

Small samples of the fungi were removed from fresh leaf spots and mounted in lactophenol. Observations, measurements and drawings were prepared using a Carl Zeiss Standard W light microscope (Göttingen, Germany). Representative specimens of the fungi were deposited in the herbarium of the Universidade Federal de Viçosa (Herbarium VIC).

Taxonomy

Pseudocercospora aurelianae Firmino & O.L. Pereira, sp. nov.

PLATE 1

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Differs from *Pseudocercospora carolinensis* and *P. marcelliana* by its light brown conidia, and from *P. modesta* by its shorter conidiophores and narrower conidia.

TYPE: Brazil, Minas Gerais, Viçosa, Estação Experimental Mata do Paraíso, on leaves of *Aureliana velutina* Sendtn. (*Solanaceae*), 25 May. 2009, A. L. Firmino (VIC 31847, holotype).

ETYMOLOGY: referring to the host genus *Aureliana*.

Leaf spots epiphyllous, circular or irregular, 4–15 mm diam., necrotic, light brown, with distinct dark brownish margin. Colonies epiphyllous, pale brown. Stromata well developed, intraepidermal, 30–37.5 × 37.5–45 µm, brown. Conidiophores in dense fascicles, arising from stromata, straight, cylindrical to slightly attenuated towards a truncate tip, aseptate, rarely 1-septate, not geniculate, not branched, 8–20.5 × 2.5–4 µm, pale brown, uniform in color, thin-walled, smooth. Conidiophores reduced to conidiogenous cells (one-celled) or conidiogenous cells integrated, terminal, straight to slightly curved,

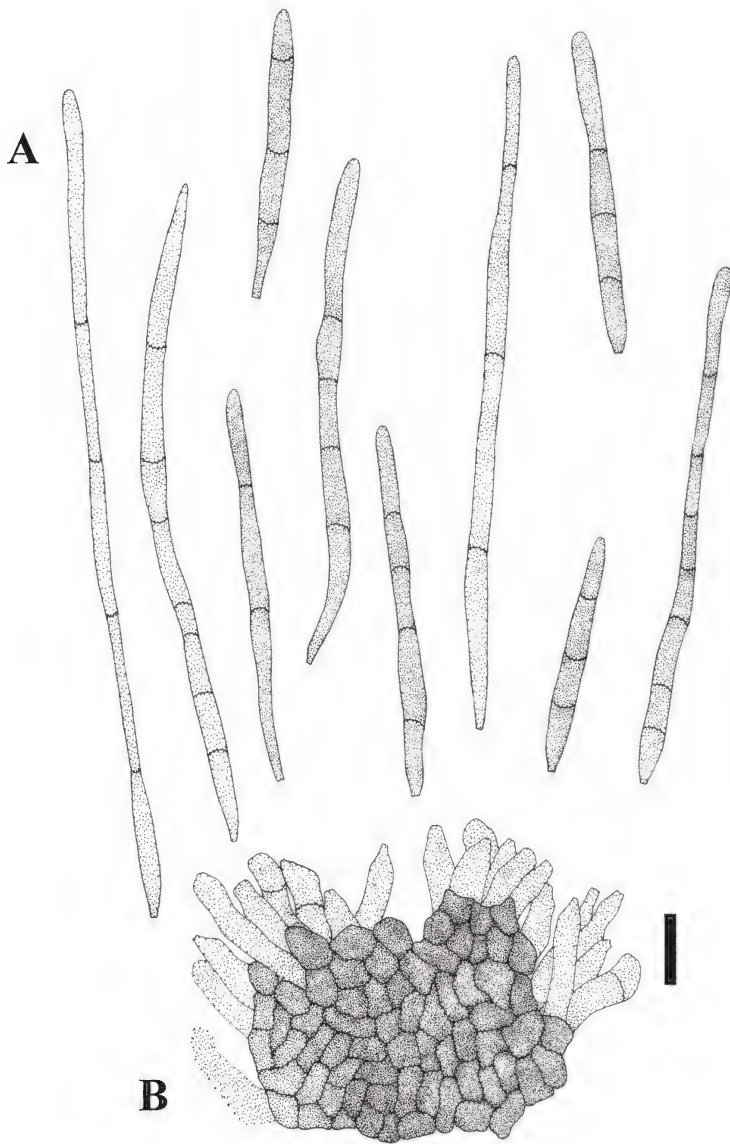


PLATE 1. *Pseudocercospora aurelianae*.
A: Conidia. B: Stomata with conidiophores. Bar = 10 µm.

pale brown. Conidiogenous loci inconspicuous or only visible as truncate tip or lateral shoulder in geniculate conidiogenous cells after sympodial proliferation, but always unthickened and not darkened. Conidia solitary, straight to slightly curved, obclavate-subcylindrical to fusiform, $27\text{--}100.5 \times 2.5\text{--}4\text{ }\mu\text{m}$, 2–7-septate, light brown, smooth, apex obtuse to subacute, obconically truncate at the base, with hilum unthickened and not darkened.

COMMENTS — TWENTY-ONE *Pseudocercospora* species are known to associate with the *Solanaceae* (Chupp 1954; Crous & Braun 2003). The only species reported from Brazil are *Pseudocercospora atromarginalis* on *Capsicum annum*, *P. daturina* on *Brugmansia suaveolens*, *P. solani-asperi* on *Solanum asperum*, and *P. venezuelae* on *S. argenteum* and *S. gilo* (Crous & Braun 2003). The new species is the first cercosporoid fungus reported on *Aureliana*.

Pseudocercospora aurelianae is morphologically close to *P. carolinensis* (Tharp) U. Braun & Crous and *P. marcelliana* (Chupp) U. Braun & Crous in the lack of superficial mycelium and the presence of well-developed stromata with short conidiophores forming sporodochial conidiomata, but *P. carolinensis* and *P. marcelliana* differ in their hyaline to subhyaline conidia (Chupp 1954). Like *P. aurelianae*, *P. modesta* (Syd.) Deighton has large stromata, but differs by its longer conidiophores ($15\text{--}75\text{ }\mu\text{m}$) and much broader conidia ($4\text{--}6\text{ }\mu\text{m}$; Chupp 1954).

***Pseudocercospora vicosae* Firmino & O.L. Pereira, sp. nov.**

PLATE 2

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Differs from *Pseudocercospora eupatorii* by its shorter conidia.

TYPE: Brazil, Minas Gerais, Viçosa, Estação Experimental Mata do Paraíso, on leaves of *Eupatorium* sp. (*Asteraceae*), 4 May. 2009, A. L. Firmino (VIC 31848, holotype).

ETYMOLOGY: referring to the type locality.

Leaf spots amphigenous, circular or irregular, 2–11 mm diam., never coalescent, dark brown. Colonies mainly epiphyllous, light brown. Stromata well-developed, intraepidermal, $47.5\text{--}70 \times 55\text{--}97.5\text{ }\mu\text{m}$ diam., brown. Conidiophores loosely fasciculate, arising from stromata, unbranched, flexuous to curved, cylindrical, $18.5\text{--}56 \times 3\text{--}4\text{ }\mu\text{m}$, 1–2-septate, light brown, paler at the apex, thin-walled, smooth. Conidiogenous cells integrated, terminal, flexuous to curved, pale. Conidiogenous loci inconspicuous or only visible as truncate tip or subdenticulate lateral shoulder formed after sympodial proliferation, but always unthickened and not darkened. Conidia solitary, straight to slightly curved, obclavate to fusiforme, $20\text{--}91 \times 2.5\text{--}4\text{ }\mu\text{m}$, 1–8-septate, light brown, thin-walled, smooth, apex obtuse to subacute, obconically truncate at the base, hilum unthickened, not darkened.

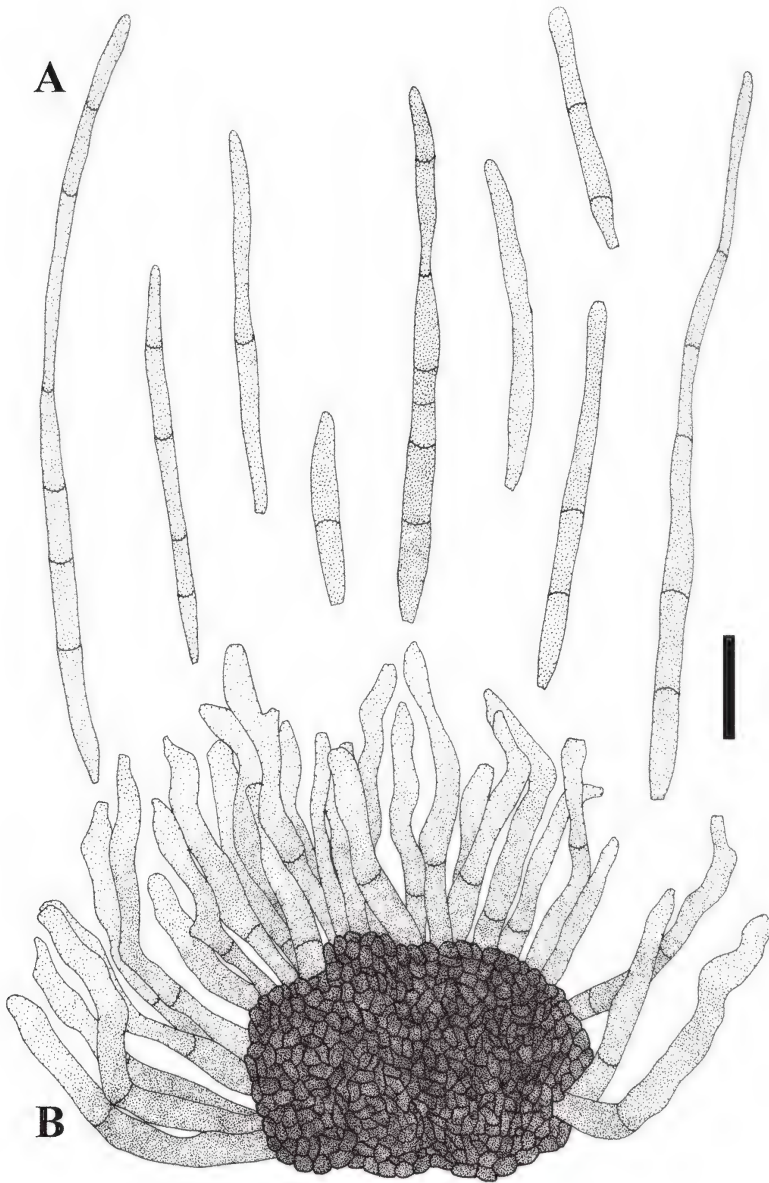


PLATE 2. *Pseudocercospora vicosae*.
A: Conidia. B: Stomata with conidiophores. Bar = 10 µm.

COMMENTS — Forty-two *Pseudocercospora* species are known to associate with the Asteraceae (Chupp 1954; Braun & Castañeda 1991; Crous & Braun 2003). The only two other species reported from Brazil are *P. elephantopodicola* on *Elephantopus* sp. (Braun & Freire 2006) and *P. plunkettii* on *Mikania micrantha* (Barreto & Evans 1995). Among the forty-two species of *Pseudocercospora* described in association with plants of this family, only *P. aciculina* (Chupp) U. Braun & Crous, *P. ageratoides* (Ellis & Everh.) Y.L. Guo, *P. eupatorii* (Peck) U. Braun & Castañeda and *P. eupatorii-formosani* U. Braun & Bagyan. are associated with *Eupatorium* spp. (Crous & Braun 2003).

Pseudocercospora vicosae is morphologically close to the North American *P. eupatorii* in the lack of superficial mycelium and the presence of well-developed stromata, but *P. eupatorii* differs in its shorter, rarely septate conidiophores (10–35 µm), and longer conidia (50–190 µm; Chupp 1954).

***Passalora rolliniae* Firmino & O.L. Pereira, sp. nov.**

PLATE 3

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Differs from *Passalora miliusae* by its much longer and more septate conidiophores, its solitary or catenate light brown conidia, and its annonaceous host plant.

HOLOTYPE: Brazil, Minas Gerais, Viçosa, Estação Experimental Mata do Paraíso, on leaves of *Rollinia sylvatica* (A. St.-Hil.) Mart. (Annonaceae), 21 January. 2009, A. L. Firmino (VIC 31846, holotype).

ETYMOLOGY: referring to the host genus *Rollinia*.

Leaf spots hypophyllous, circular or irregular, 1–9 mm diam., brown. Colonies mainly hypophyllous. Stroma absent, Conidiophores simple or mostly branched, straight to somewhat curved, 107–361 × 2.5–4.5 µm, 3–7-septate, solitary, erect olivaceous, smooth, thin-walled,. Conidiogenous cells integrated, terminal or intercalate, monoblastic or polyblastic (1–2 loci), olivaceous. Conidiogenous loci conspicuous, somewhat thickened and slightly darkened. Conidia solitary or catenate, straight to flexuous, cylindrical to clavate-obclavate, 6–37 × 2–4.5 µm, 0–3-septate, without constrictions at the septa, obconically attenuated at the base with a thickened and darkened hilum, apex rounded or attenuated, without hilum in solitary conidia or with a single or occasionally two hila in catenate conidia, light brown, thin-walled, smooth.

COMMENTS — Six *Passalora* species are known to associate with the Annonaceae (Chupp 1954; Crous & Braun 2003). The only other species reported from Brazil are *Passalora annonigena* on *Annona* spp. and *P. xylopieae* on *A. dioica* and *Xylopia aromatica* (Braun & Freire 2002; Crous & Braun 2003). *Passalora rolliniae* is the first cercosporoid hyphomycete on *Rollinia*.

Passalora rolliniae morphologically resembles *Passalora miliusae* U. Braun & Crous (= *Mycovellosiella indica* P. Kumar & Kamal), which differs by its host plant (*Miliusa*, family Rubiaceae), its growth habit on the leaf hairs, its much

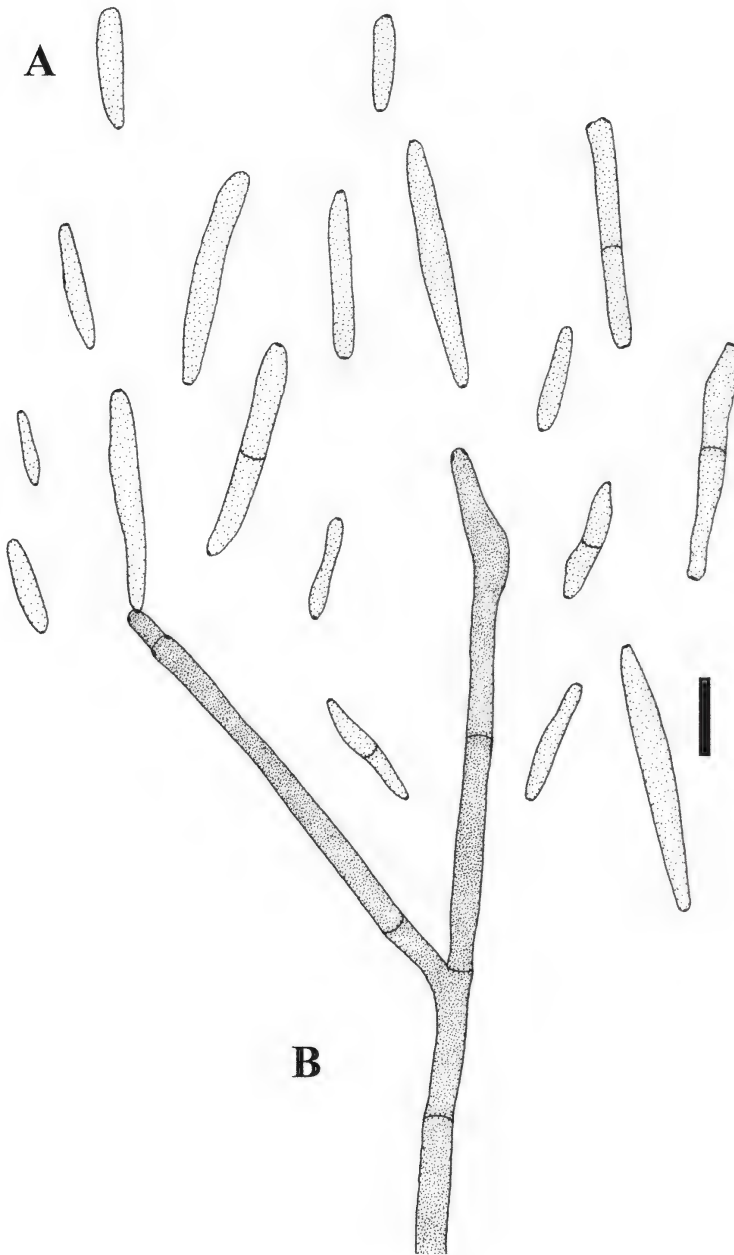


PLATE 3. *Passalora rolliniae*.
A: Conidia. B: Conidiophores. Bar = 10 μ m.

shorter and less septate conidiophores, and its larger, mostly solitary, subhyaline conidia [$14.5\text{--}50 \times <5.5 \mu\text{m}$] (Kumar & Kamal 1982; Crous & Braun 2003).

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